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## The public debt in Romania - factors of influence, scenarios for the future and a sustainability analysis considering both a finite and infinite time horizon

Bogdan Andrei Dumitrescu<sup>a,b,c\*</sup>

<sup>a</sup>*The Bucharest University of Economic Studies, Piata Romana nr.6, sector 1, Bucuresti, code 010374, Romania*

<sup>b</sup>*Fiscal Council, Casa Academiei Romane, Calea 13 Septembrie nr. 13, Sector 5, Bucuresti, code 050711, Romania*

<sup>c</sup>*Center for Advanced Research in Finance and Banking - CARFIB, Piata Romana nr.6, sector 1, Bucuresti, code 010374, Romania*

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### Abstract

This paper, starting from the public debt equations and the intertemporal budget constraint proposes an analysis of the evolution of public debt to GDP ratio in Romania during the 2002-2013 periods, identifying the main factors of influence and also performs a sustainability analysis on both a finite and infinite time horizon. Thus, the paper determines the gap to the level of primary balance consistent with debt sustainability under different scenarios and concludes that the current level of public indebtedness, alongside with the long term projections of the underlying factors of influence ensure the fulfillment of the obligations to the creditors.

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\* Corresponding author. Tel.: +40213184826; fax: +40213184826.  
E-mail address: [bogdan.dumitrescu@fin.ase.ro](mailto:bogdan.dumitrescu@fin.ase.ro).

## 1. Introduction

The accelerated growth of the public debt in the Euro area countries has shown the possibility of a rapid deterioration in the public finances position in the context of a steep economic downturn, a significant increase in the funding costs for countries perceived to be unsafe and of large primary deficits, the latter mainly resulting from lower budget revenue and expenditure rigidities. In the literature, a reasonable level of public debt is considered to have a positive role on economic growth. Thus, investment projects that exceed the resources available at a time can be financed, poor countries can be supported to grow faster, and the state can fulfill its role to stabilize the economy in the case of imbalances. However, from a point onwards, the public debt has a negative effect on economic growth, heavily indebted countries being exposed to the risk of capital outflows or of the rapidly deteriorating position of public finances in the context of an economic and financial crisis. The recent increase in risk premium on long-term sovereign bonds indicates that investors do not assign anymore a zero or very low credit risk for this type of investment. The risk premium evolution was differentiated, depending on the position of public finance specific to every economy and correlated with dependence on the foreign investors for financing the public debt.

The substantiation of a target for a sustainable level of public debt must also consider the concept of debt intolerance, as argued by (Reinhart et al., 2003). They show that emerging economies cannot sustain the same debt level as a share of GDP, that countries with advanced economies can manage, but a much lower one, mainly because of the limited access to capital markets of the countries from the former category. The phenomenon is related to the pro-cyclicality of the financial markets, that repeatedly lends large amounts to the emerging economies during the boom periods (associated with low returns in developed countries) and restrict capital flows to these when adverse shocks occur. But, the debtor states are also responsible for this problem: often, short-sighted governments prefer to temporarily encourage consumption by indebtedness, neglecting the long-term welfare of the citizens. The degree of debt intolerance of a country depends on, among other things, the past credit events, the inflation rate over time in that country, the public institutions development stage, the level and the maturity structure of the government debt.

(Reinhart and Rogoff, 2009) showed that when the debt exceeds a certain level, which may be significantly different from one country to another, the financial crises become more likely and more severe. Moreover, the negative impact on economic growth is not linear, but increases exponentially as the debt-GDP ratio is approaching 100% (considering the case of industrialized countries).

(Cecchetti et al., 2011) identified, studying also developed economies, a sustainable debt level of 85% of GDP, a superior level leading to a decrease of the economic growth rate, the negative impact being higher as we move away, upward from this level. Considering the additional costs of an ageing population and the impact of possible shocks on the economic advance and interest rates, the target would be significantly lower. The authors also show that delaying the adoption of the necessary adjustment policies will lead to the increase of future costs associated with the implementation of tardive measures.

The financial and economic crisis has fully highlighted the vulnerabilities of indebted economies, the level of public debt being extremely difficult to control in the context of an economic downturn, an increase of real interest rates and difficulties in the financial system. Levels, that were previously considered sustainable for indebtedness, are now perceived as excessive and generate serious solvency problems. The tolerance level for the public debt in emerging countries is significantly lower, probably below the one stated in the Maastricht Treaty and is also difficult to estimate. In this context, reducing the public debt is essential in order to restore the market confidence and to generate sufficient room for maneuver for the state, so that, in the event of a future crisis, macroeconomic stabilization measures can be promoted.

Further, it will be presented a framework for the analysis of the public debt-GDP ratio evolution in Romania in the period 2002-2012, depending on the representative factors, followed by scenarios for the future and an evaluation of its sustainability on finite and infinite time horizon. Thus, it will be calculated that level of primary balance, that is considered sustainable, respectively that level which leads to the achievement of a certain target regarding the public debt level or ensures full payment on long-term of the current debt, under various scenarios regarding the evolution of the relevant macroeconomic variables. It will also be presented a sensitivity analysis by which alternative scenarios for the evolution of the public debt as a share of GDP will be constructed, depending on changes in assumptions regarding the factors of influence.

## 2. Determinants of the evolution of public debt in Romania in the 2002 – 2012 period and perspectives for the 2013 – 2017 period

The starting point in the analysis of the public debt is the budget identity, formalized according to Walsh, 2003 [4], which can be expressed by the following relationship:

$$G_t + i_t B_{t-1} = T_t + (B_t - B_{t-1}) + (H_t - H_{t-1}) \quad (1)$$

where  $t$  represent the period (expressed in years),  $G_t$  the primary budgetary expenditure,  $B_t$  the level of public debt,  $i_t$  the average nominal interest rate on public debt,  $T_t$  the budgetary revenue and  $H_t$  the monetary base.

The budgetary expenditures are financed either by taxes, by increasing borrowing or by currency issuance. Considering that the direct purchase of government securities by the central banks is not possible in EMU countries, we assume that seigniorage revenues are equal to zero. Instead, we consider other factors that influence the level of public debt, grouped under the name of the stock-flow-adjustment. In essence, here we include the accumulation of financial assets, changes in the value of debt denominated in foreign currency and statistical adjustments. The variations of the national currency compared to the major currencies lead to changes in the RON value of the debt denominated in foreign currency, and this is reflected in the budget identity only at the level of stock-flow-adjustment. Also, privatization proceeds are included in this variable because, although these do not diminish the primary deficit, they contribute to its financing. Given these aspects and the relationship above, after certain algebraic transformations we obtain:

$$B_t = -W_t + B_{t-1} + i_t B_{t-1} - SFA_t \quad (2)$$

where  $W_t$  represents the primary deficit and  $SFA_t$  is the stock flow adjustment.

Equation (2) indicates that the public debt level at time  $t$  is influenced by its previous value (the level from the previous year), the primary deficit, interest expenditure and the stock-flow adjustment. An advantage of using the primary deficit instead of the budget deficit is represented by the fact that in this way the influence of the change in interest expenditure is shown separately, allowing the adjustment according to the registered inflation (a higher inflation leads to a decrease of the interest payment effort in real terms). Based on the equation (2), the annual change of the public debt can be written as:

$$\Delta B_t = -W_t + i_t B_{t-1} - SFA_t \quad (3)$$

For a deeper analysis, also from the light of cross-country comparisons, the public debt is compared to the available repayment resources, respectively is expressed as a percentage of GDP. Dividing the equation (3) to GDP for year  $t$  and performing some algebraic transformations, similar to (Cafiso, 2012) we obtain:

$$b_t = -w_t + \frac{1+i_t}{(1+\pi_t)(1+\eta_t)} b_{t-1} - sfa_t \quad (4)$$

where the variables written in lower case are expressed as GDP ratios and have the same meaning as when writing in capitals,  $\pi_t$  is inflation measured by the GDP deflator,  $\eta_t$  represent the growth rate of real GDP. It can be noted that the denominator is the nominal GDP index.

The above equation explains the public debt value at time  $t$  considering the primary balance, the debt from the previous year adjusted with the difference between the real interest rate and the economic growth and taking into account the stock-flow adjustment. The change in debt as percentage of GDP is given by:

$$\Delta b_t = -w_t + \left( \frac{1+i_t}{(1+\pi_t)(1+\eta_t)} - 1 \right) * b_{t-1} - sfa_t \quad (5)$$

The coefficient associated to the debt from the previous period  $b_{t-1}$  represents the snowball effect and it is very

important in the analysis of the public debt evolution. If this coefficient is negative (the growth rate exceeds the real interest rate), then the public debt as a percentage of GDP will have a downward trend even if the primary deficit is equal to 0, hence under the terms of recording a deficit at the level of general consolidated budget. It is relevant to note that the real interest rate is calculated based on the GDP deflator because in terms of nominal convergence it is important to analyze the public debt to GDP ratio. Conversely, if the real interest rate is higher than the economic growth rate (negative snowball effect), primary surpluses are required in order to stabilize or decrease the public debt to GDP ratio.

Using an approximation, the public debt variation can be further detailed considering explicitly the effect of nominal interest rates, inflation and economic growth, as according to (Cottarelli, 2010):

$$\Delta b_t = -w_t + \left( \frac{i_t}{(1+\pi_t)*(1+\eta_t)} - \frac{\pi_t}{(1+\pi_t)*(1+\eta_t)} \right) * b_{t-1} - \frac{\eta_t}{(1+\eta_t)} - sfa_t \quad (6)$$

Equation (6) has the benefit that it allows to calculate the contribution of the representative factors influencing public debt or to develop projections using forecasts of the representative macroeconomic variables.

Further the public debt developments in Romania in the period 2002-2012 will be assessed considering the main determinants, as described by equation (6). The data used have annual frequency, are taken from Eurostat and are expressed according to ESA95 methodology. Using equation (6), the contribution of each representative factor to the public debt evolution (expressed in percentage points of GDP) is calculated and the results are described in the table below:

Table 1: The contribution of the relevant factors to the evolution of public debt, in percentage points of GDP

Year	Change in public debt (% of GDP)	The contribution of the primary balance (% of GDP)	The contribution of the nominal interest rate (% of GDP)	The contribution of the inflation rate (% of GDP)	The contribution of the economic growth rate (% of GDP)	The contribution of the stock flow adjustment (% of GDP)
2002	-0,80	0,50	1,94	-4,52	-1,25	3,53
2003	-3,40	0,10	1,23	-4,49	-1,23	1,19
2004	-2,80	0,30	1,20	-2,66	-1,68	0,65
2005	-2,90	0,10	1,03	-1,95	-0,75	-1,12
2006	-3,40	-1,40	0,67	-1,40	-1,16	-2,91
2007	0,40	-2,20	0,58	-1,39	-0,73	-0,26
2008	0,60	-5,00	0,57	-1,58	-0,87	-2,51
2009	10,20	-7,50	1,54	-0,58	0,95	0,79
2010	6,90	-5,30	1,43	-1,29	0,26	1,19
2011	4,20	-3,90	1,50	-1,18	-0,66	0,63
2012	3,20	-1,20	1,71	-1,58	-0,24	2,11
Average contribution	1,11	-2,32	1,22	-2,06	-0,67	0,30

Source: Eurostat, own calculations

It can be noted that the primary balance was the main factor that contributed to the increase in the public debt, with an average contribution of 2.32 percentage points over the analyzed period, the 2008 - 2011 interval being characterized by a sharp deterioration in the budget balance as a result of the international financial crisis. The cumulative contribution of the primary deficit in the period 2008-2011 was 21.7 percentage points, approximately equal with the change in the debt stock, highlighting significant weaknesses of the public finance position and demonstrating that public debt may increase sharply in a relatively short time, under the conditions of unsustainable

fiscal policies. Similar to the case of Romania, the primary balance was the main factor in the sharp increase of public debt in the EU in 2008-2010, as shown by (Cafiso, 2012). Romania's chance was represented by the very low initial level of public debt, which allowed the practice of high deficits during the plenary manifestation of the crisis. If Romania had entered the crisis with the current debt level, it probably would have been forced to promote even a more restrictive fiscal policy, further extending the recession.

Nominal interest expenditure had an average contribution of 1.22 percentage points, while the Romanian state has issued debt at reasonable interest rates in general, on this contributing the foreign currency loans at lower interest rates than those charged to loans in national currency. It should be noted that the losses or gains from the exchange rate difference are reflected in the stock-flow adjustment.

Inflation was the main factor that contributed to the reduction of the public debt burden in real terms, with an average annual contribution of 2.06 percentage points. Basically, the state borrowed at negative real interest rates in the period 2002-2008, as from 2009, in the context of the significant demand deficit that contributed to the slowdown in price growth and rising nominal interest rates, real rates became positive. A special situation occurred in 2009 when the state paid an average interest rate of 11.2% for the public debt, which resulted in an increase of the real interest rate to a record of 8%. In the 2013-2018 period, the inflation is forecasted to be at much lower levels than in the past and also considering the decline in bond yields, the real interest rate is expected to be below 2%.

The economic growth contributed with an average of 0.67 percentage points to the decline of the public debt (expressed as share of GDP), but the financial crisis showed the difficulty of stabilizing the level of the public debt in the context of a severe recession. The stock-flow adjustment contributed with about 0.3 percentage points to the increase of the public debt, but there have been significant differences between one period and other. Because of the high share of foreign currency denominated debt, there are risks of increased public debt burden due to currency depreciation. However, the high share of foreign currency debt is explained by the fact that the domestic banking system lacks the necessary resources to meet the Government's demand for loans, so, the Government has constantly appealed to external funding in order to avoid crowding out of investments.

Equation (4) can be also used for forecasting the future level of the public debt, given the nominal interest rate, the primary balance, the GDP deflator, the economic growth rate and the stock-flow adjustment. The results are significantly influenced by the considered hypothesis, so it is useful to undertake a sensitivity analysis, e.g. by constructing scenarios based on alternative assumptions. For example, higher interest rates than the initial projections involve greater efforts to pay the public debt, and lower economic growth rates imply higher public debt to GDP ratios compared to the initial situation.

The assumptions used for the determinants of the public debt are based on IMF's evaluation from September 2013, given Romania's request for a new stand-by arrangement, but also on the latest data released by the National Commission of Prognosis, which can be found in the updated version of the 2014-2016 Fiscal Strategy. The data used and the projections for the baseline scenario for 2013-2017, which were obtained by successive iterations based on of equation (4), are shown in the table below.

Table 2: Projections for public debt and for its determinants

Year	Primary balance (% of GDP)	Nominal interest rate (%)	Inflation rate (% - GDP deflator)	Real interest rate (%)	Economic growth rate (% of GDP)	Stock flow adjustment (% of GDP)	Snowball effect	Public debt (% of GDP)
2013	-0,8	4,49	4,5	-0,01	2	-0,1	-0,0197	37,85
2014	-0,5	4,50	3,4	1,10	2,2	0	-0,0112	37,93
2015	0,3	4,62	3,3	1,32	2,5	0	-0,0121	37,17
2016	0,3	4,78	2,9	1,88	2,9	0	-0,0106	36,48
2017	0,3	4,94	2,7	2,24	3,4	0	-0,0119	35,74
2018	0,2	4,82	2,7	2,12	3,5	0	-0,0140	35,04

Source: IMF Staff Report, National Commission of Prognosis, own calculations

Under the baseline scenario, the public debt is projected to reach a level of 35.04% of GDP until 2018, considering the acceleration of economic growth and the moderate inflation rates and also the achievement of primary surpluses from 2015. Nominal interest rates will be the main factor that will increase the public debt in the context of a relatively high debt stock. In the period 2013-2017, the snowball effect is negative, which represents a positive aspect for the future trajectory of the public debt.

The uncertainties concerning the accuracy of the assumptions require the development of a sensitivity analysis by considering alternative scenarios. Thereby, the trajectory of the public debt in the period 2013-2018 will be forecasted in terms of economic growth rates greater or smaller with 1 pp., a lower or higher real interest with 1 pp. and combinations between the possible developments of the GDP and the real interest rate. The results are shown in the table below:

Table 3: Sensitivity analysis

Year	Baseline scenario	Optimistic scenario: economic growth rate + 1pp	Pessimistic scenario: economic growth rate - 1pp	Pessimistic scenario: economic growth rate - 1pp and interest rate +1 pp	Optimistic scenario: economic growth rate + 1pp and interest rate -1 pp
2012	37,90	37,90	37,90	37,90	37,90
2013	37,85	37,69	38,42	38,78	37,34
2014	37,93	37,41	38,86	39,59	36,71
2015	37,17	36,30	38,47	39,58	35,28
2016	36,48	35,27	38,14	39,62	33,94
2017	35,74	34,22	37,75	39,61	32,59
2018	35,04	33,21	37,39	39,61	31,33

Source: Eurostat, own calculations

In an optimistic scenario (characterized by a higher than expected economic growth by 1 percentage point and a lower real interest rate by the same percentage), a reduction in the public debt to 31.33% of GDP will be observed, equivalent to a decline with 3.71 percentage points of GDP compared to the level from the baseline scenario). By contrast, considering a pessimistic scenario, where the growth rate of the real GDP is lower by 1 pp., in conjunction with a higher real interest rate by 1 pp than in the baseline scenario, the public debt as a share of GDP will rise to 39.61% (with 4.57 percentage points of GDP more than the baseline scenario). Therefore, the evolution of the debt is significantly influenced by the considered assumptions, and reducing the burden usually occurs in a relatively long time, while the deterioration of the public finances position can be steep in the context of a severe economic crisis.

In terms of the nominal convergence criteria related to public debt, Romania's position is relatively favorable, the current debt and its projections pointing to a stabilization followed by a gradual reduction over the medium term. However, the tolerance level of public debt for Romania is far from the level of 60% of GDP stated in the Maastricht Treaty and a debt reduction is recommended over the medium term. In Romania, a public debt higher than 40% of GDP is likely to create uncertainty among investors with direct impact on the financing conditions given that a significant share of public debt is contracted on short term.

### 3. Public debt sustainability analysis

The sustainability of public finances refers to the possibility of a government to respect its financial obligations related to current and future public debt. There is no precise definition for a sustainable fiscal position, but the concept is intuitive: in the first instance, it involves a debt level that does not imply (in the present or in the future) interest payments so high that they cannot be paid. In other words, fiscal sustainability refers to the possibility of fiscal policy to be conducted as in the present, while unsustainable fiscal policy requires corrective measures.

The literature defines the fiscal sustainability, on the one hand, in terms of public debt rates that converge to a finite value to avoid a growing tax burden, and on the other hand, the fiscal policy is sustainable if the present value of the future surpluses equals the present value of the public debt.

The broader definition of sustainability refers to the solvency condition of the state, formalized through the intertemporal budget constraint. Choosing an infinite time horizon in this type of analysis provides an overview of the sustainability of public finances, but it may be ineffective in terms of policy implementation. Finite time version entail the establishment of a target date at which the public debt should reach a certain level that is fixed. If the target date is closer to the present, it is necessary a stronger commitment of the Government. At the same time, setting a too high debt target may compromise the sustainability in the period after the target date, while choosing a too ambitious level impose a higher tax burden on current taxpayers compared to those from a distant future. But, whatever the time horizon considered, sustainability is assessed according to the current level of public debt, the primary balance and the additional costs of population aging.

In this paper, the sustainability of the public finances position will be evaluated by determining the primary budget gap, defined as the difference between the sustainable level of primary balance and the actual projected level:

$$\text{Primary\_gap} = \text{Primary\_balance}^* - \text{Primary\_balance}_t \quad (7)$$

where \* designates the sustainable level. In essence, this indicator shows the difference between the optimal and the current level or the necessary adjustment size. Determining the sustainable primary balance is influenced by the time horizon on which the analysis is performed, respectively the extent to which this is finite or infinite. In the first case, the calculation involves determining the level of the primary balance that reduces the public debt to an arbitrary value within a fixed time horizon. In the analysis on an infinite time horizon, determining the sustainable primary balance is aimed to reduce public debt to 0 and to generate sufficient discounted primary surpluses to cover the initial public debt. In the empirical analysis, the starting point of the public debt sustainability analysis is the intertemporal budget constraint, formalized according to (Escolano, 2010):

$$(1 + \lambda) * b_{t-1} + \sum_{i=0}^{\infty} \frac{g_{t+i}}{(1+\lambda)^i} = \sum_{i=0}^{\infty} \frac{t_{t+i}}{(1+\lambda)^i} \quad (8)$$

where  $\lambda$  is the snowball effect,  $g_{t+i}$  represents the primary budgetary expenditure as a percentage of GDP, and  $t_{t+i}$  budgetary revenues as a percentage of GDP.

In essence, this shows that the discounted government expenditure (with an annual coefficient at the level of the snowball effect) to which is added the value of the public debt from the previous time adjusted with the corresponding coefficient of the compounding effect, must be covered by the discounted value of the future revenues.

The original version of equation (8), assuming a constant primary balance  $w_t$  is given by:

$$(1 + \lambda) * b_{t-1} = \lim_{\tau \rightarrow \infty} b_{\tau} * (1 + \lambda)^{-\tau} + \sum_{i=0}^{\infty} (1 + \lambda)^i * w_t \quad (9)$$

This relation shows that the level of public debt at the end of the analyzed period is equal to the initial level compounded with the snowball effect minus compounded primary balances recorded during the analyzed period. In the analysis of a finite horizon we impose a target level of the government debt at the end of period and we determine the sustainable primary balance as the level that ensures the achievement of the target on the analyzed period, using as inputs forecasts of economic growth and of real interest rate. Basically, the analysis will involve solving the above equation for the sustainable primary balance. In the analysis of the infinite horizon, it will be required a final level of the public debt equal to 0 and it will be imposed the transversality condition or “non-Ponzi game”:

$$\lim_{\tau \rightarrow \infty} b_{\tau} * (1 + \lambda)^{-\tau} = 0 \quad (10)$$

In this situation, the discounted primary surpluses fully cover the original public debt. The initial relation becomes:



$$\lim_{\tau \rightarrow \infty} \sum_{t=0}^{\infty} (1 + \lambda)^{\tau} * w_t = b_0(1 + \lambda) \quad (11)$$

The analysis implies a constant primary balance throughout the analyzed period and solving the equation using long-term forecasts for the nominal interest rate, GDP deflator and economic growth rate. An approximation of the solution to the above equation can be written as:

$$pb^* = b_0 \frac{\lambda}{1 + \lambda} \quad (12)$$

If the primary budget gap is positive ( $pb < pb^*$ ), respectively if the current primary balance is below the sustainable level, the share of public debt to GDP will increase and the current fiscal policy will be unsustainable. In this context, a sustainable primary balance could represent a suitable target of the fiscal policy, while the corresponding primary gap provides the required size of the adjustment.

Given the fact that a cautious attitude regarding the primary balance of the general consolidated budget, in conjunction with a decrease of the share of public debt to GDP, characterizes a viable long-term fiscal policy, the sustainable level of the primary balance that would allow reducing the public debt to a level of 30% in 2018 has been determined. The choice is subjective and arbitrary and several aspects should be taken into account: the proposed pace of debt reduction, the need of sufficient room of maneuver in the event of adverse shocks, the public debt tolerance threshold, as well as ensuring equity between generations and maintaining the confidence of the financial markets in order to provide financing at reasonable costs. The result was obtained by solving equation (11) in finite time, using as inputs projections from the National Commission of Prognosis and the IMF and the target public debt level and considering different scenarios for the evolution of the relevant macroeconomic variables. The primary gap has also been calculated as a difference between the sustainable and the effective primary balance, which can be seen as the adjustment effort needed to achieve the proposed target.

Thus, the sustainable primary balance, assuming a target level of 30% of GDP for the public debt by 2018, ranges from -0.13% to 2.5% of GDP according to the scenarios considered. The primary gap, an indicator which measures the size of the adjustment by reference to the actual conduct of the fiscal policy (the average primary surplus projected for the period 2014-2018 is 0.12% of GDP), ranges from 0.25% in the case of positive developments of the determinants of the public debt (higher than expected economic growth by 2 percentage points and lower real interest rate by the same percentage) to 2.38% for a pessimistic scenario (economic growth lower by 2 percentage points and real interest rate higher by 2 percentage points). Under the baseline scenario, the additional effort required to adjust the level of the public debt to 30% of GDP in 2018 is 1.02 pp of GDP. Assuming a target level of indebtedness, it is at the discretion of the government how to cover the primary gap, namely by increasing budget revenues or by decreasing costs. For even more unfavorable developments of the macroeconomic variables, it may be optimal to postpone the adjustment policy given the existence of a certain room for maneuver in the case of the public debt.

In terms of public debt sustainability on an infinite time horizon, the empirical application of the transversality condition is quite problematic, due to the difficulty of making long-term forecasts for economic growth rate and the real interest rate. Moreover, it is known the fact that the uncertainties regarding the realization of forecasts increase as the time horizon is longer. Altăr et al., 2010 [9] estimated a potential average growth rate of 5.6% for the period 2001-2008, but decreasing as a result of the economic crisis. Given this aspect, and also the decreasing growth rates as the gap towards developed economies is reduced, it was considered a relatively conservative assumption of 3% for the long-term economic advance. In conjunction with a real interest rate of 1%, the snowball effect would be at a level of 0.02. Thus, by applying equation (12), considering the starting level of 37.85% of GDP (i.e. the level of the public debt projected for the end of 2013), the sustainable primary balance would be represented by a primary deficit of 0.77%. In this context, the actual conduct of the fiscal policy seems consistent with the long-term sustainability of the public debt.



## Concluding remarks

Romania's position regarding the public debt level is apparently comfortable, the projected level for the end of 2013 being of 37.85% of GDP, well below the threshold of 60% stated in the Maastricht Treaty. However, there are at least two reasons why the Romanian economy presents significant vulnerabilities regarding the level of indebtedness.

First, the threshold of 60% is a reasonable level for developed countries, but it is very likely that in the case of Romania to be significantly lower, considering the relatively limited access to international capital markets. A country's degree of debt intolerance depends, among other things, to the credit events from the past, the inflation rate over time, the development stage of public institutions, and the level and maturity structure of public debt. The predominance of short-term financing, the fact that the state still borrows money at high interest rates compared to the developed countries, and the low development of the domestic financial market represent strong arguments according to which the public debt in Romania must be maintained at a much lower level than that stated in Maastricht Treaty. A personal appreciation regarding the optimum level of public debt would be about fixing it so that even under significant adverse shocks, public debt should not exceed 40% of GDP.

Second, the budget balance deterioration due to the economic and financial crisis and promoting unsustainable fiscal policies in the years preceding the crisis caused a sharp increase of public debt in a relatively short time. Thus, in the period 2008-2011, the public debt has increased almost three times, respectively from a level of 13.4% of GDP at the beginning of the crisis in Romania to a level of 34.7% at the end of 2011, due to high primary deficits and economic downturn. Romania's chance was represented by the very low initial level of public debt, which allowed the practice of high deficits during the plenary manifestation of the crisis. If Romania had entered the crisis with the current debt level, it probably would have been forced to promote even more restrictive fiscal policy, further extending the recession. The fiscal consolidation achieved in the recent years has contributed to the public debt stabilization, the projected evolution for the period 2013-2018 according to the baseline scenario, being of gradual reduction to a level of 35.04% of GDP in the last year of the forecast. The difficulty of rapidly reducing the public debt and the sharp deterioration of this indicator during the crisis shows the importance of some room for maneuver that can be used if adverse shocks appear.

Regarding the sustainability of public debt, this was assessed through the intertemporal budget constraint. Solving it on a finite horizon involves the assumption of a certain debt target and determining the primary balance that leads to the achievement of that target, considering forecasts for the determinants of the public debt evolution. The choice of such target is subjective and arbitrary, and should take into account several issues: the proposed pace to reduce public debt, the need to have more room for maneuver if adverse shocks appear, the public debt tolerance threshold, ensuring fairness between generations, maintaining the confidence in the financial markets in order to provide financing at reasonable costs.

Considering the above criteria, this study proposes an optimal level of public debt of 30% of GDP by the year 2018. The size of the supplementary adjustment to achieve this target is moderate, respectively 1.04% of GDP in the baseline scenario. If considering alternative targets, this paper provides the methodology for determining the optimal level of adjustment according to several scenarios of evolution. Considering an infinite horizon, the current level of public debt and primary balance alongside with the long term projections of the underlying factors of influence ensures the fulfillment of the obligations to the creditors.

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